

## Patent Abstracts of Japan

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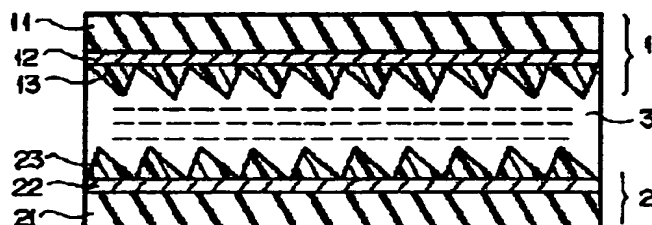
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TITLE : LIQUID CRYSTAL DISPLAY ELEMENT



**ABSTRACT :** PURPOSE: To decrease the contamination of substrates, the electrostatic breakdown of the respective elements, etc., formed on the substrates, the defects of liquid crystal images, etc., and to uniformize the orientation to liquid crystal molecules.

**CONSTITUTION:** A pair of the substrate parts 1, 2 having substrates 11, 21 and oriented films 13, 23 coating these substrates are disposed apart a specified distance by disposing the oriented film 13, 23 side on the opposite surfaces. A liquid crystal 3 is sealed between these two substrate parts. Periodic or non-periodic rugged patterns which are respectively asymmetrical in the sectional shape of the ruggedness are formed by a chemical treatment on the surfaces of the substrates 11, 21 and/or the opposite surfaces of the oriented films 13, 23 respectively in the substrate parts 1, 2. The opposite surfaces of the respective substrate parts in contact with the liquid crystal have the periodic or non-periodic rugged patterns which are respectively asymmetrical in the sectional shape of the ruggedness along the rugged patterns on the surfaces of the substrates 11, 21 and/or the opposite surfaces of the oriented films 13, 23.

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